

### **REMARKS**

The above amendments to the abstract serve to correct minor deficiencies in the original abstract, including spacing and tense. The revised abstract only serves to make the necessary changes and corrections to overcome these deficiencies. For convenience, a new abstract page has been provided as well as a marked up copy which clearly shows the changes/corrections made to the abstract. It is respectfully submitted that no new matter has been added by the above amendments.

Claims 1-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Klingler et al reference (U.S. Patent 5,679,873).

The Klingler et al reference is directed to a two-stage continuous process for the production of dinitrotoluene from toluene and nitric acid in the presence of sulfuric acid. This process comprises (A) reacting (1) toluene with (2) nitrating acid that comprises 80 to 100 wt.% of inorganic materials including sulfuric acid, nitric acid and water, and 0 to 20 wt.% of organic materials including at least 70 wt.% of nitrotoluene isomers, in which the molar ratio of nitric acid to toluene is between 0.7:1 and 1.2:1 under adiabatic conditions in a continuously operated reactor at a temperature of from about 0°C to about 140°C. This is followed by (B) separating the reaction mixture of (A) into an acid phase and an organic phase containing mononitrotoluene, (C) removing at least 5% by wt. of water from the acid phase in (B), (D) adding nitric acid to the acid phase from (C), and (E) recycling the acid phase from (D). The second stage comprises (F) reacting mononitrotoluene in the organic phase from (B) with a nitrating acid that comprises 80 to 100 wt.% of inorganic materials including sulfuric acid, nitric acid and water, and 0 to 20 wt.% of organic materials including at least 70 wt.% of nitrotoluene isomers in amounts such that the molar ratio of nitric acid to mononitrotoluene is between 0.7:1 and 1.2:1 under adiabatic conditions at a temperature of from about 40°C to about 180°C. This is followed by (G) separating the reaction mixture of (F) into an acid phase and an organic phase containing dinitrotoluene, (H) removing at least 5% by wt. of water from the acid phase from (G), (I) adding mononitrotoluene to the vapors generated in

(H), (J) adding nitric acid to the acid phase from (H), (K) recycling the acid phase from (J) to the reaction vessel in which (F) is carried out, and (L) recovering dinitrotoluene from the organic phase of (G).

Applicants respectfully submit that the presently claimed invention is not rendered obvious by the Klingler et al reference (U.S. Patent 5,679,873).

The Klingler et al reference (U.S. 5,679,873) discloses a two-stage process for the production of dinitrotoluene. In this aspect, it is similar to the presently claimed invention which is also a two-stage process for the production of dinitrotoluene. The Klingler et al reference differs from the presently claimed invention in that both stages therein are conducted under adiabatic conditions. See column 2, lines 60-67; and column 3, lines 7-13 and lines 38-55. Also see steps (A) and (F) of Claim 1 at column 5, lines 29-45 and at column 6, lines 3-19. By comparison, the first stage of the presently claimed process is conducted under adiabatic conditions and the second stage is conducted under isothermal conditions.

The Klingler et al reference does not suggest the presently claimed process to one of ordinary skill in the art. This reference does not suggest to the skilled artisan that the first stage of the process be carried out adiabatically and that the second stage of the process be carried out isothermally. Although adiabatic processes are known and isothermal processes are known, there is no suggestion in the Klingler et al reference to combine these and use adiabatic conditions in one stage (i.e. the first stage) of the process and isothermal conditions in another stage (i.e. the second stage) of the process. Applicants respectfully submit that in the absence of such a suggestion, the presently claimed invention is not properly rejected as being obvious under 35 U.S.C. 103(a) over the Klingler et al reference (U.S. 5,679,873). Accordingly, it is respectfully submitted that this rejection is improper and requested that it be withdrawn.

In view of the above amendments and remarks, Applicants respectfully request the allowance of Claims 1-7.

Respectfully Submitted,

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PROCESS FOR THE TWO-STEP PRODUCTION OF DINITROLUENE

ABSTRACT OF THE DISCLOSURE

The invention relates to a process for the production of dinitrotoluene by the two-stage nitration of toluene. In the first stage of this process, toluene was reacted adiabatically with nitrating acid so that at least 90% of the toluene was reacted off and no more than 70% of the toluene formed dinitrotoluene. The resulting organic phase containing mononitrotoluene and aqueous acid phase containing sulfuric acid were separated, and the aqueous acid phase containing sulfuric acid was concentrated by flash evaporation. The resulting concentrated sulfuric acid was recycled into the reaction in the first stage, and/or into the reaction in the second stage, and/or into the concentration in the second stage. In the second stage, the organic phase containing mononitrotoluene from the first stage was completely reacted isothermally with nitrating acid. The organic phase and the aqueous acid phase containing sulfuric acid were then separated, and the aqueous acid phase containing sulfuric acid was concentrated by vacuum evaporation. The resulting concentrated sulfuric acid was recycled into the reaction in the first stage and/or the second stage.